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PARASITIC NEMATODES OF TROPICAL MEGASCOLECID EARTHWORM *PHERETIMA LEUCOCIRCA* FROM BA VI NATIONAL PARK IN VIET NAM

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Паразитические нематоды тропических мегасколецидных дождевых червей *Pheretima leucocirca* из Национального Парка Ба Ви во Вьетнаме. Спиридонов С. Э., Иванова Е. С. — Представители нескольких родов дрилонематидных и теластоматидных нематод, включая один новый вид рода *Iponema*, два новых вида рода *Homungella*, два новых вида рода *Siconema*, один новый вид рода *Travassosinema* и один новый вид *Posterovulva*, описаны из полости тела и просвета кишечника тропических дождевых червей, собранных на горе Ба Ви около Ханоя во Вьетнаме.
Ключевые слова: дрилонематиды, теластоматиды, дождевые черви, Вьетнам.

Parasitic Nematodes of Tropical Megascolecid Earthworm *Pheretima leucocirca* from Ba Vi National Park in Viet Nam. Spiridonov S. E., Ivanova E. S. — Representatives of several genera of drilonematid and thelastomatid nematodes including one new species of *Iponema*, two new species of *Homungella*, two new species of *Siconema*, one new species of *Travassosinema* and one new species of *Posterovulva* are described from the body cavity and intestinal lumen of tropical megascolecid earthworms *Pheretima leucocirca* collected on the Ba Vi mountain near Hanoi, Viet Nam.
Key words: drilonematids, thelastomatids, earthworms, Viet Nam.

Parasitic nematodes of invertebrates are studied in lesser scale than nematode parasites of vertebrates, though some taxa of nematodes are comprised entirely of parasites, which inhabit the invertebrate hosts on adult stage. E.g. the superfamily Drilonematoidea (drilonematids) consists of obligate parasites of earthworms. The phauna of drilonematids is especially rich and diverse in tropical forests. Previously up to 5 species of drilonematids were found in the single specimen of earthworm host (Ivanova, Spiridonov, 1987). *Ph. leucocirca* earthworms from Ba Vi National Park in Viet Nam were found infected with even higher diversity of parasitic nematodes, which are described below.

Material and methods. *Pheretima leucocirca* earthworms were collected on the altitude of 1100—1150 m near Den Thuong pagoda atop the Ba Vi mountain. This species is the dominant earthworm inhabiting organic litter and space beneath the stones in evergreen non-deciduous forest. Earthworms were fixed on the site of collection with 6% formaline and transported to Moscow, where these annelids were dissected and nematodes were recovered. Nematodes were mounted in anhydrous glycerin. Measurements and drawings were made with the use of *camera lucida*. The mean ± SD and range in parentheses are indicated in micrometers (mkm) for main morphometric features (L — body length, D — maximal body diameter, Oes — the length of pharynx, Cd — tail length, Sp — spicula length, Gb — gubernaculum length, with a, b, c and V for De Manian indices and position of vulva as percentage of body length). All holotypes are deposited in the collection of the Institute of Parasitology of the Russian Academy of Sciences.

Order Rhabditida Chitwood, 1933
Superfamily Drilonematoidea Chitwood, 1950
Family Drilonematidae Chitwood, 1950

Iponema tonkinense Spiridonov et Ivanova, sp. n. (Fig. 1)

Material: Holotype – male: L = 790; D = 30; Oes = 111; Cd = 70; a = 26.33; b = 7.12; c = 11.29, Sp = 18; Gub = 8. Paratypes, 1 male: L = 779; D = 32; Oes = 111; Cd = 107; a = 25.13; b = 7.02; c = 10.12; Sp = 18; Gub = 7. 9 females: L = 781±48 (690−845); D = 34±1.9 (30−37); Oes = 100±12.8 (110−120); Cd = 143±9.9 (131−163); a = 30±0.9 (21.7−24.1); b = 7.0±0.4 (6.5−7.5); c = 5.5±0.3 (5.0−6.0); V = 45.4±3.8 (38−50)%.

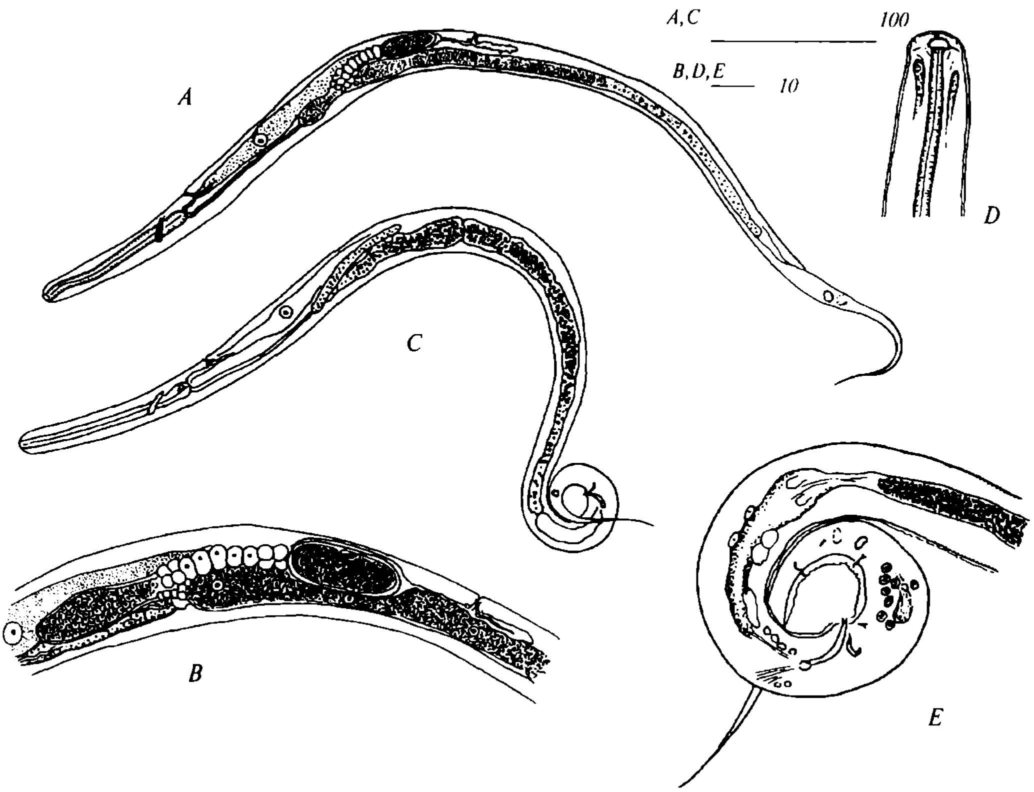


Fig. 1. *Iponema tonkinense* sp. n.: *A* — female; *B* — female, vulvar region; *C* — male; *D* — male, head end; *E* — male tail. All in lateral view, bars in mkm.

Description. Male body tapering to the posterior end and rounded anteriorly. Four cephalic 1 mkm high papillae. Amphids transversally elliptical, 5 mkm wide, in 5 mkm from anterior end. Oesophagus corpus with delicate muscle fibers, 4—5 mkm wide. Basal bulb of 10 mkm diameter, with one big nucleus. Excretory pore in 124 mkm from anterior end. Testis flexure in 230 mkm from anterior end. Two 19 mkm long curved spicules. Gubernaculum 8 mkm long with 4 mkm dorsal projection. Suckers circular with opening of 5 mkm diameter.

Females body shape similar to those of males. Four cephalic 2 mkm high papillae. Amphids transversally elliptical, 6—7 mkm wide, in 5—6 mkm from anterior end. Oesophagus as in males. Nerve ring before the bulbus. Excretory pore in 298—503 mkm from anterior end. Excretory duct 1 mkm wide. Ovary tip cell near the anal opening. *Receptaculum seminis* on the gonad anterior flexure, about 40 mkm long and 15 mkm wide, filled with spermatozoa of 1 mkm diameter. Short postvulvar sac. Egg-shells smooth, 42—47x17—19 mkm. Caudal part conical, elongated. Circular suckers with opening of 5—6 mkm diameter.

Differential diagnosis. *I. tonkinense* sp. n. can be distinguished from all other 7 species of the genus by the smaller body, oesophagus, spicules and egg-shells. In shape of tail and spicules new species is resembling *I. pheretimae* Timm, 1971 but differs in elliptical shape of amphidial opening (Timm, 1971). From *I. minor* Timm et Maggenti, 1966, which is characterized by the similar body shape, *I. tonkinense* sp. n. can be distinguished by the shape of gubernaculum and male tail (Timm, Maggenti, 1966).

Family Homungellidae Timm, 1966

Homungella baviense Spiridonov et Ivanova, sp. n. (Fig. 2)

Material: Holotype — female: L = 1790; D = 70; Oes = 223; Cd = 340; a = 25.57; b = 8.03; c = 5.26; V = 49.7%. Paratypes, 7 males: L = 1421±132 (1230–1620); D = 78±6.9 (70–88); Oes = 218±24.2 (193–265); Cd = 93.4±7.5 (83–100); a = 18.2±1.8 (16.3–21.3); b = 6.5±0.5 (5.9–7.3); c = 15.3±1.8 (12.3–17.8). Paratypes, 7 females: L = 1541±152 (1340–1790); D = 96.8±30.6 (70–160); Oes = 270±16.2 (193–250); Cd = 271±57 (210–370); a = 17.4±5.9 (8.3 – 25.5); b = 7.0±0.9 (5.4–8.0); c = 5.8±0.9 (4.4–7.2); V = 53±3.8 (46–57)%.

Description. Female body bluntly rounded anteriorly, tapering to the posterior end; cuticle covered with delicate membrane. Anterior end with single sickle-shaped cephalic hook with 18 mkm long blade connected with cuticular 4 mkm long tube of 14 mkm diameter. Cuticular tube leads to stomatal opening of 4 mkm diameter and slightly displaced dorsally. Cephalic armature from cuticular ridges 3–4 mkm wide more thickened on the dorsal side. Amphids in 20 mkm from hook base with inner pouch 10 mkm long. Cuticular rim of amphids connected with the ridges of cephalic armature. Oesophagus corpus 16 mkm wide; narrower isthmus encircled by nerve ring. Swollen glandular basal bulb displaced dorsally. Excretory pore 3–5 mkm wide in 20–25 mkm from base of bulb. Excretory duct sickle-shaped, with heavily sclerotized walls 2 – 3 mkm wide and 70 mkm long. Excretory cell prominent with lateral channels

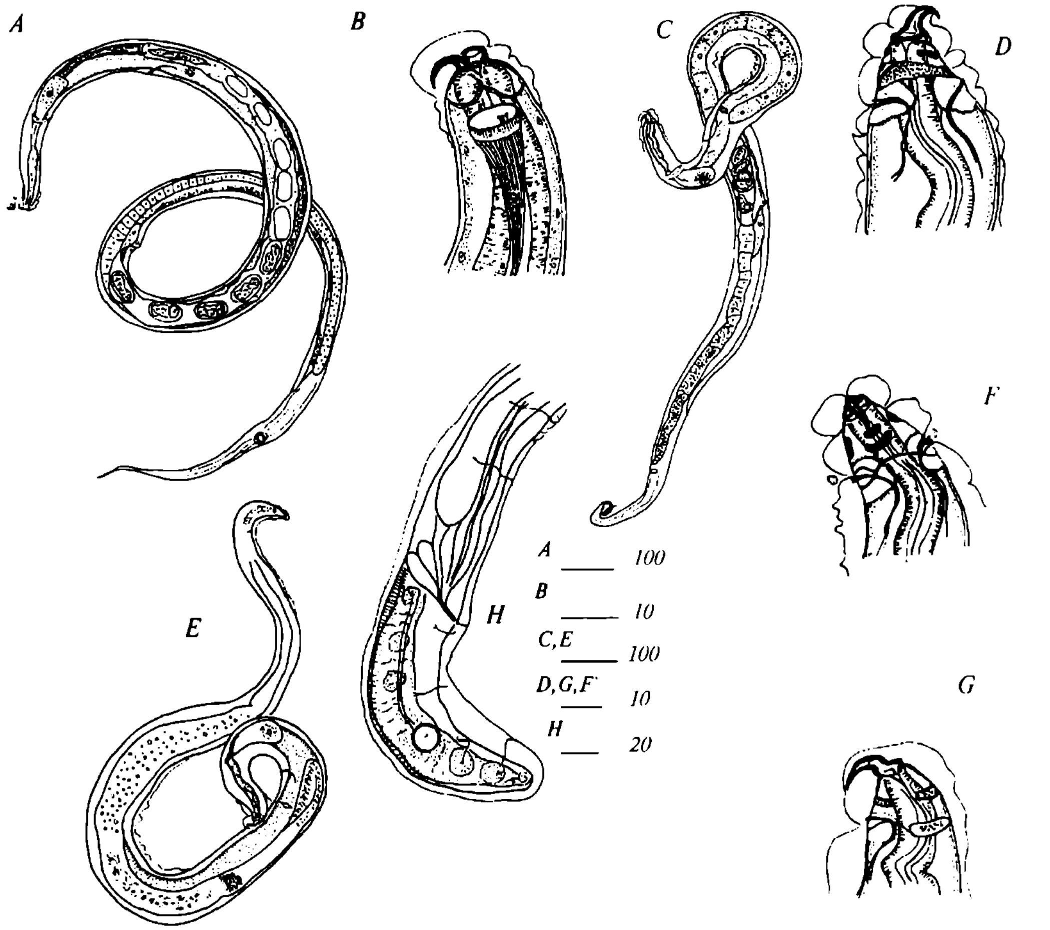


Fig. 2. *Homungella tonkinense* sp. n. (*A, B*) and *H. baviense* sp. n. (*C, D, E, F, G, H*): *A* — female; *B* — female, head end; *C* — female; *D* — female head, ventral view; *E* — male; *F* — male head, dorsal view; *G* — male head; *H* — male tail. All in lateral view unless otherwise indicated, bars in mkm.

traced to the tail. Ovary tip cell in tail. *Receptaculum seminis* on the ovary flexure, non off-set, filled by filamentous sperm. Egg-shells 43–48 x 25–28 mkm, smooth, 3–5 per uterus. Short rudimentary postvulvar sack. Suckers in 90 mkm behind anus, almost round in shape with outer rim of 28 mkm diameter, inner rim of 16 mkm diameter, and opening of 14 mkm diameter.

Anterior end of male body as in females. Body is narrowing on the level of *vas deferens* (4–6 cells per section). Tail tip rounded. Testis flexure on excretory duct level. Spermatozoa in central part of gonadal tube, rod-like, 6 mkm long.. Eleven pairs of genital papillae: 7 pairs of preanal, 3 pairs postanal directed ventralward and 2 pairs terminal directed dorsalward. Sucker circular with 6–8 mkm diameter of opening.

Differential diagnosis. The present species close to *H. seponense* Spiridonov, 1994 in body size, De Manian indices, vulva position, position of excretory pore and size of head hook (Spiridonov, 1994), but differs in another structure of cephalic armature, presence of filamentous sperm in *vas deferens*, more numerous precloacal papillae, shorter eggs with smooth shells and absense of club-like mucro on female tail. In egg size and head structures the present species resembles *H. ornitorhynchum* Ivanova et al., 1987, but differs in smooth egg shells and 3–4 times lesser index "a" (Ivanova, Spiridonov, 1987).

Homungella tonkinense Spiridonov et Ivanova, sp. n. (Fig. 2)

Material: Holotype – female: L = 3055; D = 63; Oes = 278; Cd = 305; a = 48.49; b = 10.99; c = 4.33; V = 54.8 %. Paratypes, 4 females: L = 2445±349 (2190–3055); D = 73±12.5 (63–95); Oes = 266±14.7 (248–285); Cd = 371±92 (305–530); a = 34±8.6 (25.1–48.5); b = 9.5±1.0 (8.3–10.9); c = 5.8±1.3 (4.3–7.1); V = 58±8.8 (52–73)%.

Description. Body cylindrical, with rounded head end and conical pointed tail. Cephalic hook with 12 —13 mkm long blade connected with 4 mkm long tube of 14 mkm diameter. Cephalic armature from cuticular ridges 3— 4 mkm wide, more thickened on the dorsal side and connected with amphidial openings. Elliptical amphids in 20 mkm from hook base with 6 mkm long and 15–17 mkm wide opening. Oesophagus corpus 15-16 mkm wide. Nerve ring on 30 mkm long isthmus and anterior part of elongated 100 mkm long bulb. Intestine well developed, filled with dark globules. Excretory pore in 200 mkm behind bulb up to 5 mkm wide on prominent projection, excretory duct 2–3 — mkm wide and 50-60 mkm long. Lateral channels 1–1.5 mkm wide can be traced on 150 mkm posteriorly. Ovary begins near anus and extends anteriorly where reflexed just behind excretory pore forming long narrow *receptaculum seminis* filled with filamentous 2 mkm long sperm cells. Egg shells mammillated, 58–63 x 25–27 mkm, 3–8 in uterus. Short rudimentary postvulvar sack. Suckers with 25–28 mkm diameter of outer rim and 12 mkm diameter of opening (3–4 sensillae in sucker cavity).

Differential diagnosis. The present species is most similar to *H. monodontium* Timm, 1966 in body size, oesophagus length, tail length, position of excretory pore and vulva (Timm, 1966), but differs in egg-shell ornamentation (not punctate in *H. monodontium*), position of cephalic hook forming acute not blunt angle with head end surface, shorter sclerotized portion of head end. *H. tonkinense* sp. n. resembles *H. laotense* Spiridonov, 1994, but differs in 1.5 time larger size, more heavily mammillate egg shells and larger suckers (Spiridonov, 1994).

Family Ungellidae Chitwood, 1950

Siconema baviense Spiridonov et Ivanova, sp. n. (Fig. 3)

Material: Holotype–female: L = 520; D = 106; Oes = 71; a = 4.91; b = 7.32; V = 49.0 %. Paratypes, 7 males: L = 413±30 (383–453); D = 58±9.8 (50–74); Oes = 74±16.4 (42–90); Cd = 148±16.6 (130–

178); a = 7.2±1.1 (6.1–9.1); b = 5.8±1.7 (4.3–9.3); c = 2.7±0.1 (2.5–3.0). Paratypes, 12 females: L = 561±102 (376–748); D = 111±19.5 (72–143); Oes = 74.8±12.7 (60–99); a = 5.1±1.1 (4.2–8.4); b = 7.6±1.3 (5.1–10.8); V = 45.1±4.6 (35.8–51.2)%.

Description. Female body covered with folded membrane, expanded posteriorly and before vulva, tapering to both ends and at mid-body. Tail spike 25–30 mkm in females. Cephalic hooks displaced dorsally, with 7–9 mkm long hook base slightly embedded in head end, dorsal blades 5–6 mkm and ventral blades 4–5 mkm long. Four setiform cephalic papillae around cephalic hooks. Amphids with thickened margin and small pouch 3 x 6 mkm below hook base. Oesophagus with dorsally displaced bulb. Nerve ring before bulb. Intestine poorly developed. Rectum visible in some specimens in 100 mkm behind vulva. Excretory pore 1.5 mkm wide on protuberance just behind nerve ring. Excretory duct heavily sclerotized, 1 mkm wide and 50 mkm long. Ovary begins near the base of tail spike. Ovary cells crenate. Egg shells 48–53 x 22–25 mkm, covered with small tubercles and two polar caps, 1–3 eggs per uterus. Outer radially striated part of suckers in the form of invagination 40–45 mkm in diameter, covered with membrane; inner part from fibrous tissue.

Males about 1.5 times shorter than females. Anterior part as in females. Body widening before anus and tapering behind suckers. Testis flexure 90–100 mkm long in 100 mkm from oesophagus. Two small processes near cloacal opening. Suckers in 50 mkm behind cloacal opening, 28–30 mkm in diameter, round, not prominent, striated transversally.

Differential diagnosis. In structure of suckers and presence of deep sucker invagination *S. baviense* sp. n. is close to *Siconema aequicrassum* Spiridonov, 1992 but differs in body shape, small size, egg shells (Spiridonov, 1992). It resembles *Synoecnema anseriforme* Timm, 1959 in body shape and small size (Timm, 1959), but possesses suckers resembling ones in *Thainema* species (Ivanova, et al., 1987, Ivanova,

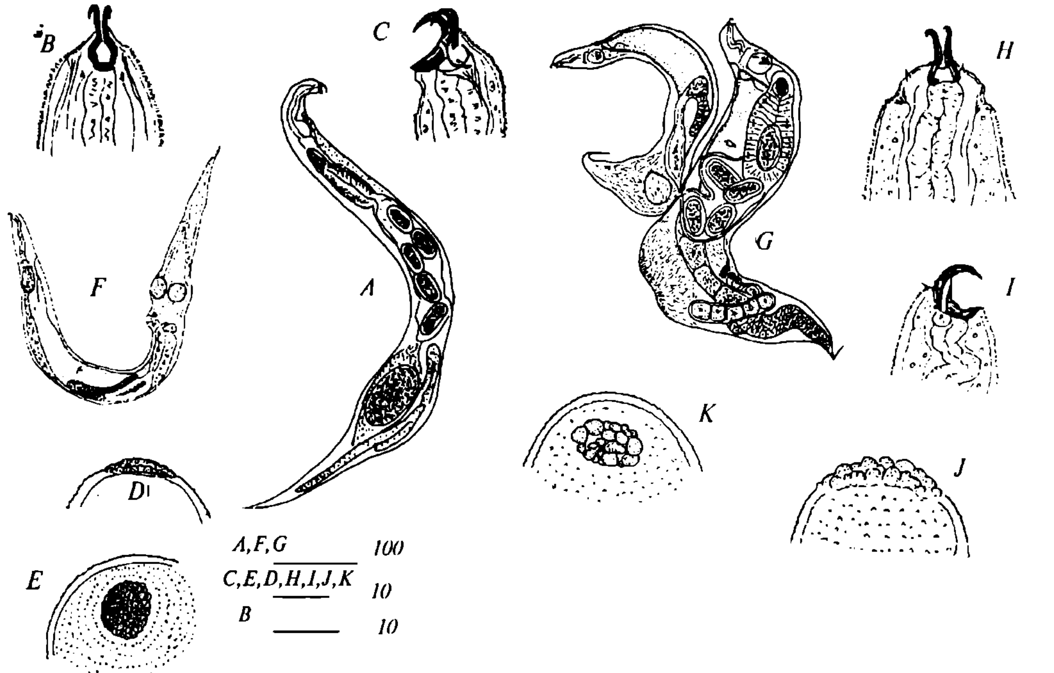


Fig. 3. *Siconema tonkinense* sp. n. (*A, B, C, D, E, F*) and *S. baviense* sp. n. (*G, H, I, K, J*): *A* — female; *B* — female head, dorsal view, *C* — male head; *D, E* — egg shell; *F* — male; *G* — male and female *in copula*; *H* — female head, dorsal view; *I* — male head; *K, J* — egg shell. All in lateral view unless otherwise indicated, bars in mkm.

1996). However, all species of *Synoecnema* have long slit-like suckers and both *Thainema* species have suckers with deep inner cavity absent in present species.

Siconema tonkinense Spiridonov et Ivanova, sp. n. (Fig. 3)

Material: Holotype — female: L = 678; D = 78; Oes = 93; a = 8.58; b = 7.29; V = 52.8 %. Paratypes, 4 males: L = 620±87 (540—703); D = 47.7±7.6 (39—57); Oes = 115±9.0 (103—123); Cd = 204±43.5 (160—258); a = 13.0±1.0 (12.0—14.1); b = 5.4±0.7 (4.5—6.1); c = 3.1±0.3 (2.7—3.4). Paratypes, 8 females: L = 752±100 (580—892); D = 82±22.3 (51—117); Oes = 102±7.2 (92—114); a = 9,7±1.9 (7.6—13.4); b = 7.4±1.1 (5.7—9.1); V = 47±4.2 (40—53)%.

Description. Female body gradually tapering to head end, swollen behind vulva and abruptly tapering to tail end with pointed terminus. Longitudinal striation on the cuticle. Head inclined dorsally. Head hooks slightly embedded in head tissue by base of hooks. Base of hooks 7—8 mkm , dorsal hooks 5—6 mkm and ventral hooks 3—4 mkm long. Amphids open just below hook base. Long clavate oesophagus slightly curved with dorsally displaced bulb. Excretory pore on bulb level. Excretory duct 1—1.5 mkm wide 45 mkm long. *Receptaculum seminis* in 20—25 mkm behind bulb, about 40 x 15 mkm in size, filled with spherical spermatozoa of 2 mkm diameter, non off-set. Ovary tip cell near the tail terminus. Egg-shells 48—52 x 20—25 mkm, heavily punctate with two polar caps of round tubercles, 3—5 per uterus. Rectum visible in some specimens in 100 mkm behind vulva. Large elliptical suckers slightly invaginated, with 30—45 mkm opening covered by thin membrane and surrounded by radially striated ring 8 mkm wide. Inner fibrous structures up to one half of tail diameter.

Male anterior part as in female. Posterior third of body swollen. Testis flexure in 140—160 mkm behind bulb. Anal opening in swollen part, caudal papillae not visible. Cloacal opening located on protuberance and covered with thin membrane. Round suckers with central pore about 20 mkm in diameter in 50 mkm behind anus. Tail conical, occasionally coiled. Two long channels inside fibrous tissue of tail.

Differential diagnosis. The present species resembles *S. sinense* Timm, 1966 in shape of female tail end, structure of egg shells and shape of suckers (Timm, 1966). It is distinguished from the latter one by smaller size of body and egg shells, shape of head hooks, higher "c" index in males, more anterior position of vulva.

Order Oxyurida Skrjabin, 1923
Family Thelastomatidae Travassos, 1929
Thelastoma sp. (Fig. 4)

Material: 7 females, L = 2709±131 (2528—2861); D = 244±33 (212—293); Oes = 508±32 (463—553); Cd = 632±118 (458—838); a = 11.2±1.7 (8.8—13.5); b = 5.3±0.3 (5.1—6.0); c = 4.4±0.7 (3.3—5.5); V = 45±4.5 (39—52)%.

Description. Cephalic end with 8 protruding 10 mkm long pseudolabia. Cuticle with prominent annulation. First ring of cuticle 30 mkm long, forming cephalic capsule. Buccal cavity with strongly cuticularized cylindrical metastomal part and slightly cuticularized cheilostomal region. Oesophagus with cylindrical corpus of uniform 45—50 mkm diameter separated from the isthmus by bundles of fibers. Basal bulb with valves. Exretory pore on the bulb level in 298—503 mkm from anterior end. Excretory duct is connected with excretory vesicle. Didelphic. Elliptical smooth egg-shells of 100—118 x 73—93 mkm size. Tail with 495—683 mkm long filiform terminus.

Taxonomical remark. Morphology of found females corresponds to those of the genus *Thelastoma*, though the shape of cephalic capsule is somehow different from that of European species. It is impossible to estimate precise taxonomic position of found females in the absence of males.

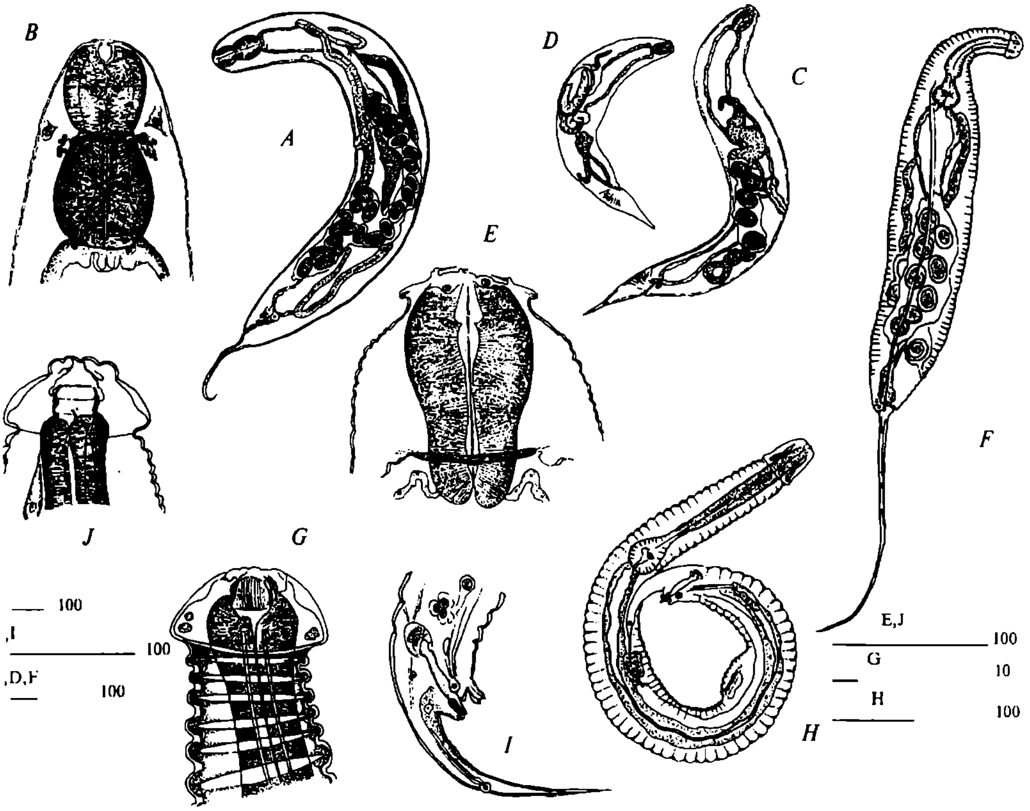


Fig. 4. *Aorurus* sp. (*A, B*), *Mesidionema* sp. (*C, D, E*), *Posterovulva danieli* sp.n. (*F, G, H, I*) and *Thelastoma* sp. (*J*): *A* — female; *B* — female, anterior end; *C* — female with thick-walled eggs; *D* — female with thin-walled egg containing juvenile; *E* — female, anterior end; *F* — female; *G* — female, head end; *H* — male; *I* — mail tail; *J* — female, head end. All in lateral view, bars in mkm.

Aorurus sp. (Fig. 4)

Material: 4 females, L = 2391±294 (1985—2688); D = 290±39 (235—320); Oes = 163±5.4 (157—170); Cd = 547±43 (490—595); a = 8.2±0.7 (7.6—9.3); b = 14.6±1.6 (12.6—16.9); c = 4.3±0.2 (4.3—4.5); V = 43±2.8 (41—47)%.

Description. Cylindrical body with rounded anterior end and thin tail terminus. Pseudolabia not conspicuous. Two rounded lateral protrusions are present on the stoma margin. Buccal cavity 25 mkm long with strongly cuticularized walls. Oesophagus with spherical corpus, completely reduced isthmus and broad pyriform basal bulb with valves. Nerve ring encircles corpus—bulb junction. Excretory pore in 320—387 mkm from anterior end. Excretory vesicle of 15x25 mkm size. Didelphic. Egg-shells with smooth surface, elliptically-elongated, 80—85 x 40—45 mkm. Tail terminus 378—560 mkm long.

Taxonomical remark. Above described females can be securely ascribed to the genus *Aorurus* Leidy, 1849 because of the characteristic oesophagus shape (Waerebeke, 1969). Males are extremely rare in *Aorurus* populations, but those are necessary for the correct specific identification.

Posterovulva danieli Spiridonov et Ivanova, sp. n. (Fig. 4)

Material: Holotype — male: L = 864; D = 68; Oes = 238; Cd = 128; Sp =38, Gb = 12, a = 12.7;b = 3.6; c= 6.8). Paratype male: L = 853; D = 63; Oes = 230; Cd = 123; Sp = 41, Gb = 12, a = 13.5; b = 3.7; c = 6.9. 10 females: L = 2458±171 (2228—2689); D = 271±28 (240—313); Oes = 366±16.9 (336—390); Cd = 1109±133 (881—1288); a = 9.1±0.5 (8.4—9.9); b = 6.7±0.3 (5.9—7.1); c = 2.2±0.1 (2.0—2.5); V

90); Cd = 1109±133 (881—1288); a = 9.1±0.5 (8.4—9.9); b = 6.7±0.3 (5.9—7.1); c = 2.2±0.1 (2.0—2.5); V = 51±2.4 (47—56)%.

Description. Male body with annulated cuticle. Cuticle is thicker in anterior part of each 10—12 mkm wide cuticular ring. Prominent lateral alae starting on isthmus level and ending before the cloaca level. Cephalic capsule 50 mkm long, without visible pseudolabia or papillae. Buccal cavity 12—13 mkm long and 10—11 mkm wide. Prominent 6 arcade glandular cells. Oesophagus with spindle—shaped corpus (maximal width 20 mkm), 12 mkm wide isthmus and valvate basal bulb of 40 mkm diameter. Nerve ring on the posterior part of corpus in 140—158 mkm from anterior end. Excretory pore inconspicuous. Testis flexure in 282—298 mkm from anterior end. Single spicula with pointed distal end.. Poorly visible gubernaculum. Two protruding 12 mkm high precloacal papillae, one pair of conical papillae on both sides of cloaca, one pair of small papillae behind the cloaca, and a pair of papillae on the tail terminus. The 55—60 mkm long region of swollen cuticle with modified surface in 100 mkm before the cloacal opening.

Female body fusiform, with prominent annulation (approximately 20 mkm wide rings in body middle). Rounded cephalic capsule of 70—75 mkm diameter, 40 mkm long. Eight rounded pseudolabia around stomatal opening. Amphidial pouches 3x3 mkm on pseudolabia level. Buccal cavity 25—27 mkm long and 18—22 mkm wide with strongly cuticularized walls covered with longitudinal striation. Oesophagus corpus swollen up to 42—45 around the buccal cavity, narrowing up to 30 mkm in central part and widening gradually toward the isthmus up to 40 mkm. Istmus 23—25 mkm wide, divided from corpus with the bundles of fibers. Basal bulb of 80—90 mkm diameter, with valves. Nerve ring in 183—213 mkm from anterior end. Excretory pore in 292—326 mkm from anterior end. Amphidelphic. *Receptaculum seminis* on posterior gonad branch. Vulva in 100—130 mkm from anal opening. Egg-shells 72—80 x 50—58 mkm. Tail terminus filament 978—1200 mkm long.

Differential diagnosis. From the type species of the genus — *Posterovulva moramangi* Waerebeke, 1969 above described *P. danieli* sp. n. can be distingusihed by the spicula length (16 mkm in type species vs. 38—41 mkm in our species, see Waerebeke, 1969, 1988), and from both *P. moramangi* and *P. skrjabini* Adamson, 1984 by the wider gap between anus and vulva (30—38 mkm *vs.* 100—130 mkm, see Adamson, 1984).

Etymology. The species is dedicated to Dr. Daniel van Waerebeke — French entomonematologist from ORSTOM.

Family Travassosinematidae Rao, 1958

Travassosinema mirabile Spiridonov et Ivanova, sp. n. (Fig. 5)

Material: Holotype — male: L = 493; D = 38; Oes = 140; Cd = 17; a = 12.9; b = 3.5; c = 29.0; spicula length 24. Paratypes, 3 females: L = 1486±165 (1296—1591); D = 101±7.6 (95—110); Oes = 223±6.4 (218—230); Cd = 550±111 (425—635); a =14.6±1.1 (13.6—15.7); b = 6.7±0.6 (5.9—7.1); c = 2.7±0.3 (2.5—3.0); V = 42±2.5 (39—44)%.

Description. Male body cylindrical with rounded anterior and pointed posterior end. Poorly conspicuous cuticle annulation with cuticle ring wide about 3 mkm in body middle. Anterior end without visible lips or papillae. One pair of 1.5 mkm high conical papillae on the nerve ring level, another pair of papillae on the basal bulb level (Fig. 5, *F*). Stomatal cavity 5 mkm long, with slightly sclerotized walls. Oesophagus with 10 mkm wide corpus and 22 mkm wide basal bulb with valves. Corpus is widened up to 15 mkm on the junction with buccal cavity. Excretory pore in 130 mkm and testis flexure in 168 mkm from anterior end. Two rows of 6 subventral precloacal 3—5 mkm high papillae. Two pairs of dorsolateral papillae on the level of

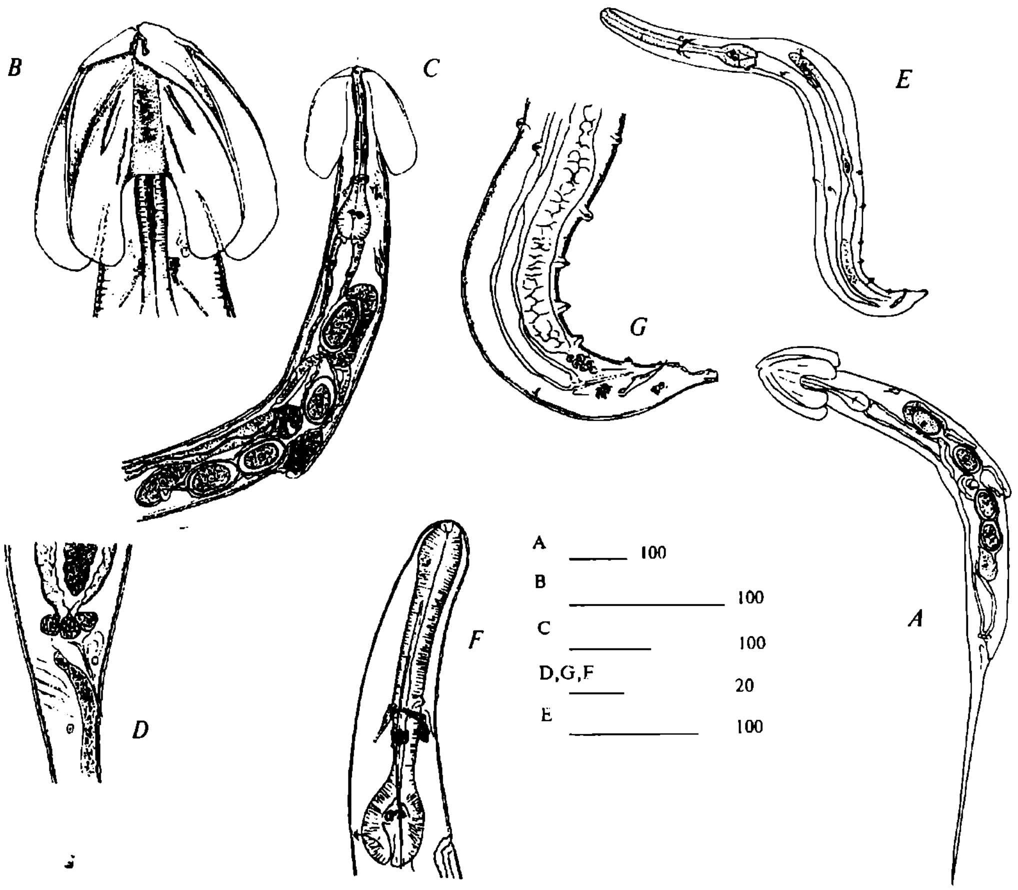


Fig. 5. *Travassosinema mirabile* sp.n.: *A* — female; *B* — female, head end; *C* — female, anterior end; *D* — female, anal region; *E* — male; *F* — male, anterior end; *G* — male tail. All in lateral view, bars in mkm.

anterior papillae of subventral rows (Fig. 5, *G*). One pair of small adanal papillae before the cloacal opening, and another pair behind it. Two pairs of small terminal papillae on the terminal tail protrusion.

Female body with cephalic umbraculum — 6 cuticular cephalic wings, approximately 180—200 mkm long. Cuticle with prominent 5—8 mkm wide rings, lateral alae absent. Oesophagus corpus about 20 mkm wide, widened up to 23—25 mkm on the place of junction with the reduced stomatal cavity. Isthmus 15 mkm wide, valvate basal bulb 50 mkm in diameter. Excretory pore in 263—310 mkm from anterior end. Excretory vesicle directed anteriad from the pore. Amphidelphic gonads. Vulva in anterior body half. Eggs with smooth shell, 60—65 x 40—45 mkm. Six cells around the rectum.

Differential diagnosis. *T. mirabile* sp. n . is similar to *T. travassosi* Rao, 1958, *T. dechambrieri* Adamson, 1987, *T. thyropygi* Hunt, 1993 in the absence of lateral alae, but can be distinguished from all these species by the length of cephalic umbraculum alae, from *T. thyropigi* and *T. travassosi* by the female body size and the egg-shell size (Hunt, 1993). It seems, that *T. mirabile* sp. n. is similar to the *T. dechambrieri* also in body shape of females (body contraction posterior to vulva, see Adamson, 1987), but newly described Vietnamese species is characterized by the much narrower body diameter (99±12 vs. 169±36) and shorter oesophagus corpus (120±14 vs. 163±20). Our species is also characterized by the very unusual distribution of papillae over the male body — apart of 6 prominent papillae of subventral rows, also two pairs of subdorsal in body middle, and two pairs of papillae on the oesophagus level of the

body are present. Such distribution distinguishes *T. mirabile* sp. n. from *T. travassosi* Rao, 1958 — only one with males described (Rao, 1958).

Family Mesidionematidae Poinar, 1978 (the family of uncertain systematic position in the order Oxyurida)

Mesidionema sp. (Fig. 4)

Material: Six females with thick-walled eggs: L = 2468±298 (1941—2738); D = 283±28.2 (250—318); Oes = 142±16.9 (118—158); Cd = 401±62 (328—495); a = 8.8±1.2 (7.3—10.4); b = 17.4±2.3 (15.1—21.5); c = 6.2±0.9 (5.4—7.8); V = 51.3±1.9 (49—53)%. 4 females with thin — walled eggs containing juveniles: L =2039±558 (1208—2388); D = 232±26.3 (195—255); Oes = 129±6.7 (120—135); Cd = 325±86 (200—398); a = 8.6±1.7 (6.2—9.9); b = 15.7±3.7 (10.1—17.7); c = 6.3±0.6 (5.6—6.8); V = 50.5±1.9 (48—52)%.

Description. Spindle-shaped nematodes with spacy pseudocoel. Coarsely annulated cuticle. Region around stoma opening slightly protruding, without annulation, with four submedian bristle-like-papillae directed toward stoma opening, two rounded lateral papillae and four rounded submedian papillae directed posteriorward. Oesophagus with wide anterior part (corpus) and narrowed valveless basal part. Oesophagus lumen with strongly cuticularized lining. Nerve ring encircles posterior part of the oesophagus. Excretory pore in 188—390 mkm from anterior end. Excretory vesicle directed anteriorward from the pore. Didelphic. Up to 8 thick-walled eggs with zygotae in uteri or 1—2 thin — walled eggs with developed juveniles. Thick — walled eggs 130—133x88—98 mkm, thin-walled eggs 225—243 x 90—103. Conical caudal part.

Taxonomical remark. *Mesidionema* sp. females found in Vietnamese earthworms are prominently different from those described by Poinar (1978b) from African earthworms *Eudrilus eugeniae.* Nevertheless, we are postponing the description of these nematodes because of the absence of males, which are crucial for the taxonomy of this group.

Discussion. The representatives of ten species of parasitic nematodes were found in the coelomic cavity and intestinal lumen of *Ph. leucocirca* earthworms. The diversity of oxyuroid nematodes parasitic in host intestinal lumen was surprising. Previously Poinar (1978a) reported single species of *Thelastoma* from the intestinal lumen of African earthworm *Eudrilus eugeniae* and considered this thelastomatid as true parasite of earthworm. Some of the oxyroid nematodes described above are usually associated with diplopods or insects. So, *Posterovulva* nematodes were reported from scaphisterptid diplopods and scarab larvae, *Travassosinema* and *Aorurus* species — from diplopods only. Diplopods are very common and numerous in the Ba Vi forest, so one can presume, that oxyuroid nematodes found in earthworms, represent nematodes of arthropods occasionally developing in annelids — the result of "horizontal transfer" of parasitic nematodes in ecosystem from one host to another. Normal morphological development of oxyuroid nematodes in earthworms and their ability to produce the eggs indicate that such unusual host is fully supportive for oxyuroid nematode life cycle. In our opinion the presence of oxyuroid nematodes in annelid intestine is a normal phenomenon of their life and could be explained in accordance to the idea of Dale (1970), who postulated specific strategy of oxyuroid nematodes — the association with two and more populations of invertebrate hosts in the same locality.

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ЗАМЕТКА

Нові знахідки дикого кота (*Felis sylvestris* Schr) на Прикарпатті. [New Records of the Wild Cat (*Felis sylvestris* Schr) in the East Carpathian Region]. — Дикий кіт — один з рідкісних видів ссавців теріофауни України, що занесений до національної Червоної книги та Міжнародного європейського Червоного списку. За останні роки нами на території Прикарпаття відмічено 2 знахідки. Залишки однієї особини було знайдено в буковому лісі в с. Микуличин м. Яремча Івано-Франківської області (750 м) зимою 1989 року. Другий самець (?) був вбитий в хліві одного з жителів, де він постійно годувався курьми, в кінці листопада 1996 року в с. Саджавка Надвірнянського району Івано-Франківської області. Місця постійного перебування кота відмічались у закинутій будівлі поряд з заростями вільхи. Проміри добутих особин та їх черепів: вага, кг — 8,6; довжина, см: тіла — 70, хвоста — 30, вуха — ?, ступні — Проміри черепа, мм: кандилобазальна — 95,3 та 98,2; найбільша — 100,5 та 104,0; вилична — 72,8 та 76,0; міжочна — 19,9 та 22,7; найбільша висота — та 40,5. — **О. І. Киселюк, Р. Д. Косило, Б. В. Тороус** (Карпатський національний природний парк).